

Application Serial No. 10/589,569

REMARKS

The Office Action of December 20, 2008, and the references cited therein have been carefully considered.

In this Amendment, claim 1 has been amended to more clearly distinguish the present invention over the prior art by more specifically reciting the environment of the present invention in order to provide the improved results and more clearly distinguish the claims over newly cited prior art. In particular, claim 1 has been amended to more clearly bring out that the application of the soldering material and the temporary application of heat take place from the same side of the bus bar. These limitations are fully supported in the application and do not raise any new issues not previously considered or require any new search. Accordingly, entry is respectfully requested.

The rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over the patent to Lynch (U.S. 4,001,490) in view of the patent to Steigerwalt et al. (U.S. 2,912,745) has been noted and is respectfully traversed. In urging this ground of rejection, the Examiner has essentially taken the position that the Lynch patent teaches the claimed bus bar with an aperture for the introduction of a terminal lead from a first surface plane and to which soldering may be effected from a second surface plane, but does not teach the particular conical solder nest; that the Steigerwalt patent teaches the conical solder nest; and, consequently, that it would have been obvious to form the aperture of Lynch as a conical bore as taught by Steigerwalt in order to provide a better solder connection. The conclusion reached by the Examiner is respectfully traversed. That is, it is submitted that one skilled in the art would not consider combining the teachings of the two references in the manner suggested by the Examiner, except possibly through the use of hindsight in an attempt to reach Applicant's claimed invention.

The present invention as defined in claim 1 is directed to an improved soldering nest formed in a bus bar that consists of or made entirely of a good electrical and heat-

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conducting material and has an aperture for the introduction of a terminal lead to be soldered thereto, wherein a terminal lead is introduced into the aperture from a first surface plane of the bus bar and soldering may be effected by the application of a soldering material and temporary contact with a source of heat from a second, opposite surface plane of the bus bar. According to the invention the aperture is formed by a conical bore which is perpendicular or approximately perpendicular to the surface plane of the bus bar and whose cone angle is at least 30°; the apex of the conical bore is oriented toward the first surface plane of the bus bar, and the conical bore terminates in a circular aperture whose diameter is slightly greater than the diameter of the terminal lead. As a result of the shape of the bore, the material of the bus bar, the heat is conducted away from the bore and the lead as discussed in detail in the remarks found in the last Amendment and the heat need only be applied for a short period of time, thereby providing a good solder connection while protecting the device connected to the terminal from heat damage.

The patent to Lynch discloses a bus bar having the features mentioned by the Examiner in the Office Action. However, the bus bar of Lynch initially is not concerned with electrical contact to device terminals, where heat dissipation is a problem, but rather with connections to substantial terminal posts extending from a circuit board. To make the connections to the terminals according to the Lynch patent, the bus bar according to FIG. 6 is twisted adjacent the apertures 15 in order to produce or form an interference or force fit within the aperture 15 between the bus bar and the terminal post 20 as shown, for example, in FIGS. 3 and 4 of Lynch and described, for example, in column 5, lines 26-48. This interference fits between the bus bar aperture 15 and the terminal post 20 creates a very small or tiny gap around the post; and this small, uneven gap is required to hold the bus bar in place during heating and soldering. Such a connection or interference fit would not be possible with a conical bore through the bus bar, as suggested by the Examiner, because the expanding bore would not permit holding or gripping of the bus bar as is required according to the teachings of Lynch. Accordingly, one skilled in the art would not consider providing the bus bar of Lynch with a conical bore.

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Additionally, the solder is applied according to Lynch by a solder layer applied to one surface of the bus bar. This entire bus bar is heated, and the solder will flow because of the contact or interference fit between the terminal post 20 and the bus bar within the small aperture 15, and thus with the solder layer 10. However, if the aperture 15 were conical and oriented as suggested by the Examiner, there would be no contact between the terminal post and the solder layer on the surface of the bus board, and thus no solder flow. Consequently, for this additional reason, one skilled in the art would not consider combining the teachings of Lynch and Steigerwalt.

Claim 1 further requires that the heat and solder be locally applied from the same surface of the bus bar, i.e., opposite that from which the lead is inserted, where the gap is formed around the lead and the wider circular opening of the bore is found. Lynch teaches a solder layer and heating of the entire bus bar, which is contrary to the claimed invention.

In summary, one skilled in the art would not consider combining the teachings of the Lynch and Steigerwalt patents in the manner suggested by the Examiner, since the two teachings are involved with the solution of different problems and different conditions and would not be compatible, resulting in a poor or faulty solder connection. Accordingly, it is submitted that for the above-stated reasons, claim 1, and claims 2-5 dependent thereon, are allowable over the combination of the Lynch and Steigerwalt patents under 35 U.S.C. §103(a).

Reconsideration is respectfully requested of the rejection of rejection of claims 1-5 under 35 U.S.C. §103(a) as being unpatentable over the patent to Adachi et al. (U.S. 5,065,283) in view of the patent to Steigerwalt et al. (U.S. 2,912,745). In this ground of rejection, the Examiner utilizes the Adachi et al. patent in substantially the same manner as the Lynch patent discussed above. As with the Lynch reference, it is submitted that one skilled in the art would not consider the combination suggested by the Examiner, since the result would be an inferior solder connection.

The Adachi patent shows the prior art in FIGS. 1 and 2; in column 1, discusses the drawbacks of the FIG. 1 arrangement; and, in column 2, lines 14-32, discusses the

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drawbacks of the FIG. 2 arrangement. These drawbacks are more or less the same as the starting point of the present application. The problems with the embodiment of FIG. 2 of Adachi et al. is the long exposure to heat when the bar is immersed in a solder bath, and the bus bar 1 is in direct contact with the plastic PC board 6, which has poor heat conductivity. If the aperture 7 were made conical as suggested by the Examiner, a larger volume of heated solder would be present, resulting in extend exposure of the lead to heat, since the bus bar cannot dissipate the heat as one of its sides is not cooled by air, but is heat-insulated by PC board 6. Moreover, since the heat is applied by immersing the entire bus bar in liquid solder, there is again the problem of extended heat, since the portions of the bus bar away from the soldering site will become heated and further decrease the speed of heat dissipation.

Such is not the case with the present invention, wherein the claimed heat and solder are locally applied. It should additionally be noted that according to FIG. 2 of Adachi, the diameter of the terminal or lead portion must be only slightly smaller than the diameter of the aperture in the bus bar, so that soldering along the length of the pin takes place by capillary action when the bar is immersed in the solder. If a conical aperture is provided in the embodiment of FIG. 2, then, as required by claim 1, the larger end of the conical aperture would come in contact with the solder, which would prevent capillary action from taking place, thus resulting in an inferior connection. Accordingly, one skilled in the art would not consider making the aperture of Adachi et al. conical, since it would be contrary to the basic teaching of the reference. Therefore, for the above-stated reasons, it is submitted that claim 1, and claims 2-5 dependent thereon, are allowable over the combined teachings of the Adachi et al. and Steigerwalt patents.

In view of the above amendments and for the above-stated reasons, it is submitted that all of the pending claims, i.e., claims 1-5, are allowable over the art of record and are in condition for allowance. Such action and the passage of this application to issue, therefore, are respectfully requested.

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The Examiner is of the opinion that prosecution of this application would be advanced by a personal interview, he is invited to telephone undersigned counsel to arrange for such an interview.

To the extent necessary during prosecution, Applicant hereby requests any required extension of time not otherwise requested and hereby authorizes the Commissioner to charge any required fee not intentionally omitted, including application processing, extension, extra claims, statutory disclaimer, issue, and publication fees, to Deposit Account 06-1135.

Respectfully submitted,

FITCH, EVEN, TABIN & FLANNERY

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